III. "On some of the Properties of Water and of Steam." By WILLIAM RAMSAY, F.R.S., Professor of Chemistry in University College, London, and SYDNEY YOUNG, Professor of Chemistry in University College, Bristol. Received November 5, 1891.

(Abstract.)

This investigation forms one of a series, former members of which refer to the thermal properties of ethyl oxide and various alcohols. Owing to the high temperature of the critical point of water, the work was confined to comparatively low temperatures. Tables are given in the paper of the orthobaric volumes of liquid water at temperatures between 100° and 270°; of the compressibility of water at different temperatures; of the vapour-pressures of water up to 270°; and of the density of the vapour of water under various conditions of temperature and pressure. Regnault's measurements of vapour-pressure do not extend beyond 220°; and the results of this investigation confirm them in a remarkable manner, besides amplifying them. The densities of the saturated vapour, also, measured directly, are nearly identical with those calculated from Regnault's determinations of heats of vaporisation; but near the condensing point of steam, especially at low temperatures, the pressure is too low, owing to the adhesion of water-vapour to glass, which causes condensation at pressures below the vapour-pressures. This necessarily renders the measurements near the condensing points uncertain, but the numbers calculated from Regnault's results give volumes for saturated steam agreeing sufficiently well with those obtained by direct measurements at volumes somewhat larger than those of the saturated vapour. It is probable that the real isochoric lines for water show a linear relation between temperature and pressure; but, owing to the circumstance mentioned, they deviate from rectilinearity near the condensing-points of the vapour.

IV. "On Hindoo Astronomy." By W. BRENNAND. Communicated by C. B. CLARKE, F.R.S. Received November 10, 1891.

(Abstract.)

Introduction.—Gives a short history of Indian astronomy, as known in Europe in the last century.

Treats of Indian astronomical æras, and gives some account of the Siddhantas and their authors, &c.

Ends with an investigation of the great number called the Kalpa, of 4,320,000,000 years, showing its uses in astronomical calculations,

and that there is concealed within it, as a sacred mystery, the true value of the precession of the Equinox.

Chapter I.—On the revolutions of the celestial bodies; their mean sidereal and synodic periods, as compared with the same elements in modern tables. Mean places at a given time. On the Earth's diameter, &c. On the Moon's horizontal parallax and distance from the Earth.

A theory deducing the orbits of the planets and the extent of the Universe, or Brahmanda, from the Moon's daily rate of motion in her orbit.

Theory regarding the causes of the planetary motions, &c.

Chapter II.—On trigonometrical formulæ known to the Hindoos. The construction of their tables of sines and versed sines. On the epicycle and its deferent, and on the eccentric and concentric, used for calculating the "true" place of a planet from the mean place.

Chapter III.—Problems in astronomy, on time, ascensional difference, declination, celestial longitude, horoscope, &c.

Chapters IV, V, VI.—The calculation and projection of lunar and solar eclipses.

Conjunctions, heliacal risings and settings, stars of the Zodiac, &c.,

The lunisolar year, &c.

The cycle of Jupiter of 60 years.

V. "Repulsion and Rotation produced by Alternating Electric Currents." By G. T. Walker, B.A., B.Sc., Fellow of Trinity College, Cambridge. Communicated by Prof. J. J. Thomson, F.R.S. Received November 5, 1891.

(Abstract.)

In the 'Electrical World,' May, 1887, p. 258, or the 'Electrical Engineer' (New York), June, 1887, p. 211, "Novel Phenomena of Alternating Currents," may be seen an account of some experiments by Professor Elihu Thomson on the mechanical force between conductors in which alternating currents are circulating.

In the case of a ring of metal in the presence of an electromagnet, in the coils of which an alternating current is passing, a force of repulsion is experienced by the ring, which may be explained as follows:—

Were the induced currents in the closed conductor unaffected by self-induction, the only phenomena exhibited would be alternate equal attractions and repulsions.

This may be illustrated by fig. 1. Here the strong line represents the primary and the thin the secondary, while of the dotted line any